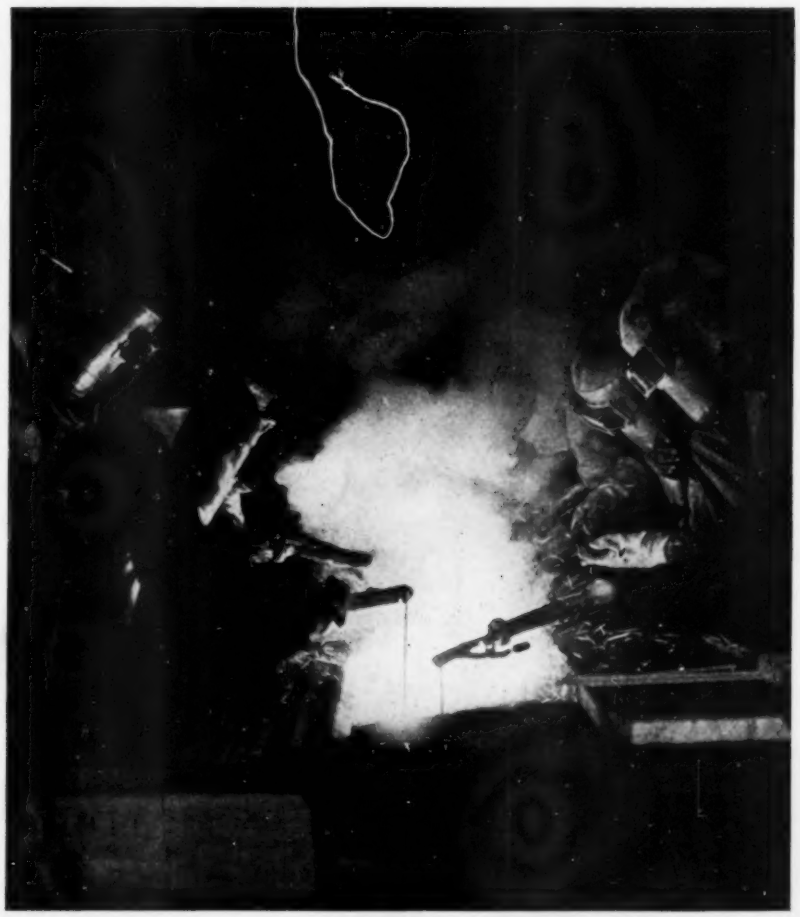
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



July 8, 1939

Fire Surgeons

See page 30

A SCIENCE SERVICE PUBLICATION

Do You Know?

Benjamin Franklin once commented that it would be cheaper for nations to buy territory they wanted than to fight for it.

As many as 67,000 people in a day put in phone calls in New York City to hear the weather forecast announced mechanically.

Volunteers training as telephone operators in England's air raid precaution service learn to handle calls talking through gas masks.

Possibility that the moon's tidal forces act like a trigger to touch off deep earthquakes in South America is being investigated scientifically.

Government scientists have invented a new food article from surplus by-products: namely, wafers or chips made of cull potatoes, skim milk, and salt.

A new type dinner bowl for the dog is divided into food and drink compartments, also made non-skid, so that it does not slip when the dog is eating.

A plant that grows 11 feet tall and has yellow, bell-like flowers has been brought to the San Francisco Fair from ruins of the Incan city of Machu Picchu in Peru.

A British government office has published a map of Britain in the Dark Ages showing distribution of tribes, location of roads, and other facts about the 440 to 840 A.D. era.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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What is the daily per capita cost of the government's new Public Health Program? p. 20.

ZOOLOGY

Where and why have American scientists established a new colony for monkeys? p. 28.

Relay runners in ancient Persia carried messages 1,500 miles in six days along the famed Royal Road from Susa to Sardis.

Testing 2,000 thermometers in a season is one service to Florida fruit growers given by the state's Horticultural Protection Service.

Looking ahead, the Bureau of Public Roads estimates that 25,000 miles of new 4-lane roads will be needed by the United States in the next 25 years.

Nineteen hundred years ago, a writer said that cancer could be cured only in its initial stages.

The World Poultry Congress held in Cleveland July 28 to August 5 is to be unusually complete in showing scientific progress of an industry.

The Chinese government is determined to destroy all poppy fields and even to execute the growers, lest opium take a new hold on the country.

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BIOLOGY

Life is Simply a Matter of Organization and Cooperation

Origin of Cells' Mutually Functioning Patterns Is The "Mystery of Mysteries," Says Dr. Edwin G. Conklin

LIFE is not found in atoms or molecules or genes as such, but in the organization and cooperation of all the constituent parts of the living organism, Dr. Edwin G. Conklin, famous Princeton biologist, president of Science Service and vice-president of the American Philosophical Society, declared at the Stanford University symposium on the cell and protoplasm.

"The origin of cellular and protoplasmic organization is a vast problem upon which science has scarcely made a beginning," said Dr. Conklin, "but once this organization or combination of constituent parts has been achieved, the fundamental properties of life emerge. Once the organization of the germ cells is established and is brought into proper relation with the environment, development results. Here in mere outline is a possible mechanism for the origin of life, for the increasing complexities of structures and functions in development, for the evolution of the million species of living things.

"The mystery of mysteries is not the mechanism of evolution, but the evolution of the mechanism by which cells and protoplasm came to have the organization that has resulted in 'the promise and potency of all life.' This is the great problem which is sure to occupy increasingly the attention of biologists in the future. From our mere beginnings in the study of cells and protoplasm we confidently look forward to the epoch-making work of the future on the origin and nature of life."

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New Division Proposed

THE OLD classical division of the world of living things into the plant and animal kingdoms should be revised, Dr. Herbert E. Copeland of Sacramento Junior College told the Botanical Society of America at its Stanford meeting.

Proposals put forward by Dr. Copeland included the setting up of two new "kingdoms." One, including bacteria and certain other lower forms known as the blue-green algae, he would call the Monera, a term coined in the nineteenth century by the German biologist Haeckel. The second, to include fungi and the red and brown algae, he would entitle the Protista.

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ENGINEERING

Refinery Machinery Is Rebuilt by Metal Spray

THROWING a molten spray of metal against worn refinery machinery, metal atomizers are saving the oil industry thousands of dollars in rebuilding costly equipment.

Huge refinery tanks damaged by corrosive petroleum products and chemicals receive sprayed atomized coating of stainless steel.

Pump rods worn down in service are taken out to large lathes and, as they slowly turn, are rebuilt to size with high carbon steel.

The metallizing atomizer process operates on the same principle as the perfume atomizer of the boudoir, report D. R. Johnson and E. K. Dewey, Jr., of the Continental Oil Company, to the American Petroleum Institute.

The protective metal is fed into the spray gun in the form of aluminum, steel or brass wire. There it is heated to a molten state. The tremendous force of the air rushing through the tip of atomizer breaks the molten metal into microscopically minute particles which cling to the interior surface. These form a coating which repels the attacks of acid and sulfur corrosion.

In the reaction chamber of a refinery cracking unit, explain the oil experts, corrosion ordinarily occurred at the rate of .05 inch each year before 10 layers of atomized aluminum were sprayed on to a total thickness of .18 inch. After the application no measurable corrosion has been noticed. From 4 to 5 per cent. of the protective coating is replaced each year.

Real money saving is achieved for pump rods cost $300 each when new. Metallizing by the huge atomizers rebuilds them for about $90 a rod.

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METAL ATOMIZER

Spraying molten metal on to oil refinery equipment is the way the petroleum industry rebuilds valuable devices and saves replacement charges.

PUBLIC HEALTH

Surgeon General Defends National Health Program

Plan Seeks to Reduce Volume of Illness By Giving Preventive Medical Services to All Areas and People

A DEFENSE of the National Health Program and specific answers to various criticisms of it were issued by Surgeon General Thomas Parran, U. S. Public Health Service, in an address, read for him, to the National Conference of Social Work in Buffalo.

"The National Health Program," in Dr. Parran's words, "represents the most comprehensive approach ever made towards solving the diverse and serious problems retarding our nation's health."

Seek to Reduce Sickness

Its objectives, he declared, are to reduce the volume of sickness and ill health by extending preventive services to all areas and people, to provide for construction and maintenance of hospitals where needed and for support of existing hospitals, to reduce disability and lengthen life by more prompt and adequate medical care of the sick, to extend indirect health protection to the worker and his family by compensation for wages lost through nonindustrial sickness and accident, and to promote greater federal effort on research in prevention and cure of diseases not now controllable.

"It is not proposed that the health and medical services of the country be federalized," Dr. Parran explained. He pointed out the need today for "group cooperative action in the rendering of medical service no less than in payment for it" and warned against standardization and creation of vested interests that would resist future change.

"The national health program does not recommend a national system of compulsory health insurance nor does it require nor coerce the states to do so," he said in answer to the charge that the national health program would lead to such a system.

To criticism of the estimated expense of the national health program, he pointed out that this amounts to a "per capita daily expenditure of one and seven-eighths cents on the average for each of us."

"Much of the opposition on the part of many people, doctors, and patients alike, to any great extension of public medical service arises," he said, "because the public medical service now provided in so many communities is of such inferior quality. A similar distrust arises from the untrained, political health officer who still is cherished in so many of our communities . . .

"The greatest contribution that you social workers can make to future sound progress in national health is by doing a better job in the provision of medical service for which you are now legally responsible."

Dr. Parran answered the charge that our present low death rate shows that we do not need a national health program by saying:

"The death rates alone you must remember are not a measure of national fitness. They do not reveal the estimated 250,000 people who are suffering from silicosis, nor the 90,000 to 100,000 cases of pellagra which occurred last year in the South, nor the recent epidemic of scurvy in Maine."

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MEDICINE

Sulfanilamide's Success Depends on Oxygen Effects

THE MYSTERY of how sulfapyridine and sulfanilamide cure pneumonia and other serious ailments has been practically solved and as a result scientists at Washington University School of Medicine are now starting to make drugs of quite different chemical composition which they hope will be even more effective remedies for human diseases.

The secret of sulfanilamide's success in curing disease depends, Prof. Philip A. Shaffer reports (*Science,* June 16) on what it does with oxygen picked up, not from the air you breathe, but from the cells in your body.

Other chemicals that do a better germ-killing job through this same mechanism can probably be found, Prof. Shaffer predicts.

Discovery of what sulfanilamide and sulfapyridine do with oxygen to cure disease also explains why they sometimes cause poisoning symptoms in the patient. These drugs, Prof. Shaffer explains, provide "a mechanism by which the sterilizing oxidation intensity of molecular oxygen is applied nearly at its maximum to bacteria and unavoidably also to some extent to host cells."

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MEDICINE

Meningotoxoid a Possible Weapon Against Meningitis

A TOXOID against meningitis, something like the toxoid now used to protect children against diphtheria, has been developed by Dr. Talat Vasfi Oz of the State Institute of Hygiene at Ankara, Turkey.

When given to humans as well as when given to experimental animals, the new meningotoxoid caused formation of antibodies in the blood, Dr. Oz reports (*Science,* June 23). Antibodies are substances which fight invading disease germs. He does not, however, report any tests of the toxoid's ability to protect either humans or animals against injections of meningitis germs (meningococci) or exposure to the disease.

The toxoid is made by formaldehyde and alum treatment of a toxin which Dr. Oz reports having obtained from meningococci, the round germs which are the cause of epidemic meningitis.

Meningitis at present is fought by a serum or by the new chemical remedy, sulfanilamide, or a combination of the two. These act by fighting the germs. Toxoids and antitoxins, on the other hand, act to neutralize the toxin or poison produced by germs. The question of whether or not the meningococci produce a true toxin, as diphtheria germs do, has not yet been settled to the satisfaction of scientists generally.

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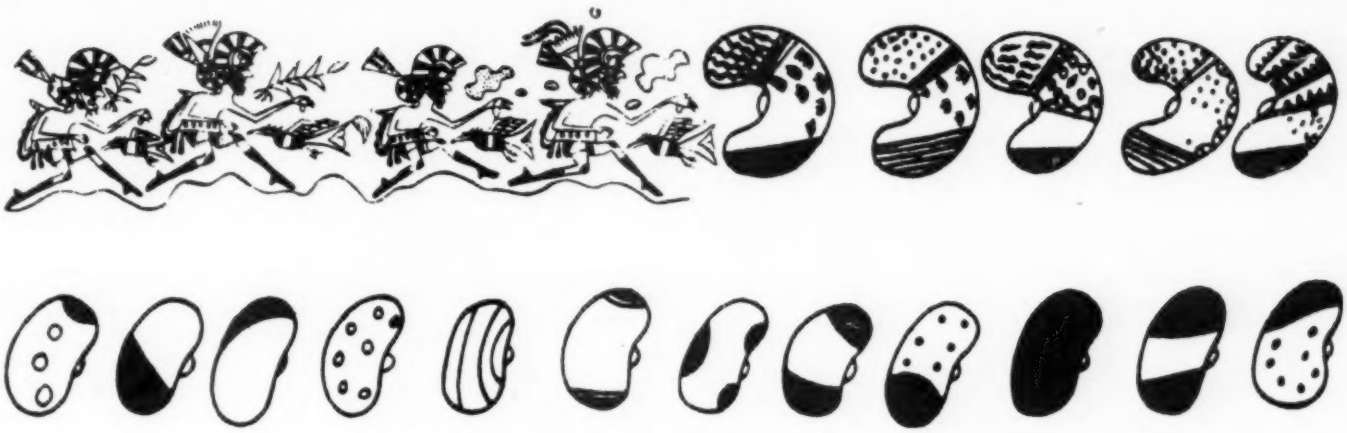
Temperatures of 120 degrees are common in Death Valley, California, in summer.

Like putting salt on a bird's tail, putting vinegar on an octopus' back is supposed to make it lose its grip.

● RADIO

A. E. Demaray, associate director of the National Park Service, will be the guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Monday, July 17, 5:45 EDST, 4:45 EST, 3:45 CST, 2:45 MST, 1:45 PST. Listen in on your local station. Listen in each Monday.



NOT A DANCE CHORUS

The small figures at the upper left are the lithe Indian runners of ancient Peru, each of whom holds a tiny bag. By the theory of the Peruvian archaeologist, Senor Rafael Larco Hoyle, each bag held a message written on beans, as in the other drawings. He has found samples of lima beans with such designs on them on Indian vases.

ARCHAEOLOGY

Who'd Write on Lima Beans? Ancient Indians, Apparently

New Theory of Peruvian Archaeologist Suggests That Bean Writing Was Used to Carry Primitive Messages

WHO'D EVER think of writing on lima beans?

Ancient Americans apparently did, is the conclusion of a noted Peruvian, Senor Rafael Larco Hoyle. He has a theory that clever Chimu Indians of the sandy north coast of Peru actually invented a lima bean writing system by marking the beans with signs that could be recognized.

If Senor Larco's detective reasoning is correct, then it means that ancient American civilization in Peru, which ultimately was welded into the Incan Empire, was not entirely dependent on memory and knot-tying for its important communications. It means that these Indians, like the Mayas and Aztecs of Mexico, were literate in their own fashion. They could read and write.

Senor Larco has detected what he believes to be writing mainly by studying clay vases of these Chimu Indians. He has plenty of these vases to study. His father, famous as a benevolent patron of Peru's archaeology, established on his ranch near Trujillo a museum said to contain over 20,000 vases from graves and ruins along Peru's coast.

No people in the world ever went on record in their art so frankly and vividly as these particular Indians. On smooth clay vases they painted scenes of everyday life—hunting, fighting, working. They shaped other vases to resemble human figures, plants, and animals, not unlike our Toby jugs, and salt cellars that masquerade as tomatoes, except that the Chimu Indians did their most extensive clay work to put into graves. When an Indian in their country died, his funeral notice was an array of clay art that told his experiences and distinctions.

Senor Larco was particularly attracted to the pictures of the Indian messenger service. These messengers are pictured running fast as legs can carry them, and with one hand outstretched carrying a small bag. It's the bag that interests Senor Larco. What could be in it? Beans, he decided. Beans with signs on them, to make sure the message is right.

First American Telegraph

The first American telegraph system, you might call this way of speeding correspondence by fast runners carrying a briefed message.

What makes him think beans were in the bag is this: He finds lima beans conspicuous in Chimu art, and the curving bean shape was usually decorated with lines, dots, or colors. Pictures of Indian runners particularly were accompanied by these decorated beans in odd spaces. Even the messengers were sometimes drawn as bean-men with human faces and legs and lima-bean bodies. Putting two and two together, the Peruvian archaeologist deduces that these Indians probably did mark or inscribe real garden beans and gave them to messengers as memorandums to be relayed to a distant receiver.

Beans Still Carried

Even today a vestige of some such ancient practice is found, when Indian farmers and herdsmen in Peru tuck away beans or grains in a pouch to keep track of the sacks of grain they harvest or the animals they are herding.

It has been well known that Peru's Indians used knotted cords to represent statistics. But efforts to detect any writing system of theirs have heretofore been discounted by archaeologists. So, the lima bean may have to stand considerable scientific scrutiny before it is accepted as America's most intellectual bean—outranking the bean of Boston.

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METALLURGY—ARCHAEOLOGY

Lead Pipe 2,000 Years Old Shown at Science Museum

PART of ancient Rome's waterway system—a piece of lead pipe 2,000 years old—is now on display at the New York Museum of Science and Industry. Still in good condition, the pipe shows the original inscription identifying its period and the contractor who laid it. It was obtained in excavations for a subcellar under the Palace Hotel, Rome.

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MEDICINE

Serum For Athlete's Foot May Come From Embryo Study

VACCINE or serum for combating athlete's foot and other troublesome skin disorders due to fungus infections may be developed as a result of research by Dr. Morris Moore of the Barnard Free Skin and Cancer Hospital, St. Louis.

While he has not yet made such a vaccine, Dr. Moore has taken what may be the first step toward this or some other weapon against fungus infections of the skin. He has found a substitute for either human "guinea pigs" or the laboratory animals themselves on which proposed remedies and preventives of the skin diseases can be tried. The substitute is the developing chick embryo. The chick embryos not only save money and trouble for disease fighters but also reduce the time element from weeks or months to days.

Vaccines against other ailments including yellow fever and horse "sleeping sickness" have been made with the use of chick embryos, a technique first developed by Drs. E. W. Goodpasture and G. J. Buddingh of Vanderbilt University School of Medicine at Nashville. Scientists also have some hope that an influenza vaccine may be produced by the same technique.

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CHEMISTRY

Synthetic Musk Patented By Du Pont Chemists

LONG-SOUGHT goal of perfume chemists—to create a synthetic musk which will have the extraordinary fixative powers of natural musk—is believed achieved by the disclosure of such compounds in patent No. 2,163,268 to the late Dr. Wallace H. Carothers and Julian W. Hill of the E. I. du Pont de Nemours and Company.

Dr. Carothers, before his death, also directed research by du Pont chemists which created nylon, the synthetic material from which fibers rivalling those of natural silk can be made.

The new patent relates to the production, with high yields, of cyclic esters having more than seven atoms in their ring structure.

"The many-membered cyclic esters are in many cases odorous compounds of great value," states the patent. "Many of them . . . have odors closely resembling those of natural musk. At the same time they possess the extraordinary fixative power which is characteristic of natural musk but is absent from most synthetic musks. The present invention provides a simple and direct method for their preparation."

Real musk is obtained from a strongly odorous substance secreted in a gland of the musk-deer and several other animals. It is imported largely from China or from Central Asia by way of Russia. A grain of musk will distinctly scent millions of cubic feet of air without any appreciable loss of weight; its odor is extremely penetrating and persistent. In its crude form it costs about as much as gold. It is an essential in perfume making, giving power and endurance to compounded perfumes. An artificial musk was first made chemically as long ago as 1888 from toluene, a coal product.

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CHEMISTRY

Strawberries Gas-Attacked Keep Two Days Longer

PRACTICAL advantage can be taken of the respiration of plants in getting berries to market and keeping them there longer in fresh condition, Dr. R. H. Landon of the University of Minnesota reported to the American Association for the Advancement of Science meeting in Milwaukee.

Freshly picked strawberries and raspberries placed in a cool, gas-tight room and treated with a 35 to 40 per cent concentration of carbon dioxide for from four to seven hours will remain in good condition 48 hours or more longer than berries not given this conditioning treatment, he stated. The cost is about five cents a crate.

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AERONAUTICS

Plan Short Three-Day Route To Buenos Aires and Rio

PAN AMERICAN Airways, whose pioneering clippers have just opened routes to England and France, is already charting a new history-making route which will cut the time between New York and leading South American cities in half.

By flying overwater night and day from New York via Bermuda and Puerto Rico, the line's giant clippers could bring Buenos Aires within three days of the chief eastern American cities and Rio de Janeiro closer than that. No definite decision to undertake this new run has yet been made.

At present, New York is very nearly six days away by air from Buenos Aires because of the necessity for overnight stops along a landmarked airway which is not fitted with lights or other night flying facilities. Planes leaving Miami every Sunday and Wednesday stop at San Juan the first night, Port of Spain (Trinidad) the second night, Para, Brazil, the third, Recife, the fourth, Rio de Janeiro, the fifth, and Buenos Aires the last day. The first part of the trip is is made in Sikorsky amphibians and the last part in Douglas landplanes. The distance, nearly 10,000 miles, is almost exactly the same for both routes.

The use of flying boats of the Boeing 41-ton class, or, if necessary, of smaller clippers such as the Sikorsky S-42B, is under consideration for the route being investigated. Thus the airline which has just started passenger service across the Atlantic to Marseilles, and will begin service in a few weeks to Southampton, in the fall or winter to New Zealand and within a year from Seattle to Alaska, is contemplating a further adventure in trail-blazing.

Without question, the Civil Aeronautics Authority and the State Department would look with favor on its establishment, provided all safety requirements are met, because bringing the United States closer to Latin America is a fundamental tenet of present American foreign policy.

The New York-Bermuda and Rio de Janeiro-Buenos Aires legs have been in regular operation for two and nine years respectively and no survey flights would be needed.

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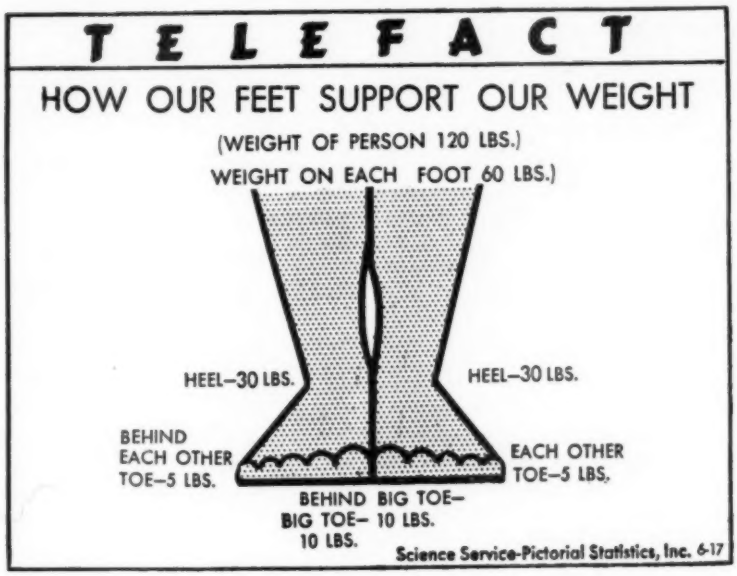

NUTRITION

New Yeast Quintuples Thiamin Content of Bread

Would Give a Loaf of White Bread the Vitamin B_1 Content of a Loaf of Bread Made from Whole Wheat

A LOAF of white bread which has the vitamin B_1 content of a whole wheat loaf, some five times as much as ordinary white bread, was predicted to the Massachusetts Institute of Technology food conference by Charles Frey, Alfred Schultz and Lawrence Atkin, all of the Fleischmann Laboratories.

Vitamin B_1, or thiamin, is an important factor in nutrition but it is not stored in the body to any significant extent and thus must be contained in basic foods. Cereal products, mainstay of the national diet, are suitable for this but these products, especially bread, have been increasingly deprived of their natural vitamin content in recent years.

The problem of restoring this loss, sometimes as great as ninety-three per cent, has been tried along many lines, but the latest and most practical employs a new yeast. This yeast contains enough thiamin to produce a loaf of white bread with the vitamin content of a whole wheat loaf but without any loss of palatableness. Although made by a new process, the yeast offers no new technical problems since its baking properties have not been altered. Possibility of such a loaf at a low cost increase would be a boon to low income groups, it is declared.

Research aimed at irradiating yeast to convert its natural ergosterol to vitamin D and to include milk solids to supplement cereal protein and minerals in the "staff of life" were also described.

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Measures Tenderness of Peas

A MACHINE which gauges the maturity and tenderness of green peas before they are canned is science's latest contribution to your palate. The device, known as the tenderometer, was described by Dr. E. J. Cameron, acting director of the National Canners Association Research Laboratory.

Since maturity is the most important factor in determining the quality of canned peas, its accurate determination plays an important part in quality control. The tenderometer measures maturity by the force required to shear a sample of raw shelled peas between two interlocking grids.

Tests show this mechanical method correlates closely with the alcohol insoluble solids test, the most reliable index of maturity in the canned product. It is expected to provide a reliable method for purchasing canning peas on a quality basis as well as for predicting the commercial grade of the canned product.

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Humidify Refrigerator

A MARKEDLY more efficient method of eliminating "freezer burn," or surface drying, which is the major cause of deterioration of frozen perishables, was described by Dr. W. H. Cook of the National Research Council, Ottawa.

More or less moisture-proof packaging to prevent evaporation is the current method but Dr. Cook has attacked the problem from the other end, humidifying the freezer's atmosphere. The biggest problems were to provide for the continuous addition of moisture and prevent ice formation on the cooler surfaces. Dr. Cook solved both at the same time by evaporating water from a brine circulated over the coils as a de-icer.

The optimum humidity seems to be about ninety-five per cent and in preliminary tests Dr. Cook has been able to maintain this with an increase of only ten or fifteen per cent on the refrigerating load.

"It seems probable," Dr. Cook said, "that still higher efficiencies can be attained but even the present performance indicates that this equipment will prevent surface drying more effectively and economically than the reduction of temperature without humidification."

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MEDICINE

Fight on Virus Diseases Brings $1000 Award

DISCOVERIES that help to speed the recovery of pneumonia patients and that promise to help the fight on virus-caused diseases such as infantile paralysis brought the Theobald Smith Award of $1000 and a bronze medal to 32-year-old Dr. Albert B. Sabin, of the Rockefeller Institute for Medical Research.

Announcement of the award was made at the meeting of the American Association for the Advancement of Science in Milwaukee.

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Chemists recall that black and white were fashionable early in the World War because American chemists had not learned to make good dye colors.

PHYSIOLOGY

Vitamin Discovery May Be Approach to Youth Quest

A VITAMIN discovery that may be an approach to man's eternal quest for continued youth has been made at the University of California.

Gray hair has been darkened and other signs of premature old age reversed by feeding concentrates of the vitamin, which is an unidentified member of the vitamin B family found in yeast, rice bran and liver. But the results, reported by Drs. Agnes Fay Morgan and Helen Davison Simms (*Science,* June 16) were obtained on rats, a black guinea pig and two young Boston bull pups.

In response to an inquiry, Dr. Morgan said no human application of the discovery yet has been made. She also expressed the hope that the public would not write to her because she has already been "deluged sufficiently" with requests for the vitamin.

Asked whether this unknown factor in yeast provided the end of Ponce de Leon's search for the Fountain of Youth, Dr. Morgan replied:

"Being a Californian I have nothing to do with Ponce de Leon."

The premature aging that resulted when the animals were deprived of the vitamin is due to the effect of the vitamin lack on the adrenal glands, Dr. Morgan's latest studies indicate. The vital cortex of these glands showed wasting and shrinkage at post mortem examination of rats that had lacked the vitamin in their diet.

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ANTHROPOLOGY

Liberty Called Greatest Of Greek Inventions

THE greatest thing the Greeks ever did was to invent liberty.

This is the conviction of Dr. Walter Woodburn Hyde, University of Pennsylvania professor of Greek and ancient history.

All the beautiful temples and statues and literature that the Greeks left as a heritage to the world can't compare in importance with that gift of putting freedom into life, for individuals.

Before the Greeks, all the great civilizations — Assyria, Egypt, Babylonia, even Persia—scarcely gave their people an inch of personal freedom, Dr. Hyde declares in an analysis of the world's first venture in liberty, reported in the Scientific Monthly. Searching history, he cannot find that Oriental states ever gave the idea a chance to grow, and the Greeks looked down on Orientals as servile and unmanly for that very reason.

A long list of modern ways and means of carrying out the liberty idea can be traced straight to Greece. Prof. Hyde includes these: democracy, representation, political parties and clubs, senates, committees, legislation, constitution, the ballot, impeachment, popular courts.

Greeks not only had liberty; they were first to theorize about it, he also finds. "They created the science and theory of politics."

But where and how was freedom invented? Nobody knows. Dr. Hyde discounts the old answer: that the geography of Greece stimulated the people to a variety of independent culture phases, and prevented their being molded into a uniform, rigid empire. Greeks, he thinks, would have evolved the same genius outside the Balkans. And if mountains and seas are so potent, why have not modern Greeks responded with great creative achievements?

Liberty had already been "invented" apparently when the council of Greek chiefs met outside the walls of Troy. Prof. Hyde suspects that ancestors of the historic Greeks brought the germ of the liberty idea with them when they migrated from the grasslands of the Danube.

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MEDICINE

Sulfanilamide May Prove Cure For Typhoid Fever

SULFANILAMIDE and sulfapyridine, already hailed far and wide as successful remedies for pneumonia, streptococcus infections, gonorrhea and other diseases, may prove equally effective as remedies for typhoid fever.

Good results with the chemical remedies in seven severe cases of typhoid fever are reported by Drs. E. H. R. Harries, Robert Swyer and Noel Thompson, of the North Eastern Hospital, London.

Most striking result, they report, was obtained in the case of a man who had "walking" typhoid and for whom any experienced doctor would have predicted a long and perilous illness. Within 10 days after entering the hospital he was in the recovery or convalescent stage. This patient was given both sulfapyridine and a serum, and the doctors suggest that this combination is probably the thing to use for treating other cases.

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IN SCIENCE

ENTOMOLOGY

War on Grasshoppers Succeeding, Bureau Reports

THE DEPARTMENT of Agriculture's poisoned-bait war on crop destroying grasshopper hordes is succeeding generally throughout the country, Lee A. Strong, chief of the Bureau of Entomology and Plant Quarantine reported.

A bran and sawdust bait mixed with deadly arsenic has been killing as high as 90 per cent of the young 'hoppers in many sections of the country, Mr. Strong said in his weekly progress report.

Control operations are complete in the southern infested portion of the Texas panhandle and New Mexico and the war in Colorado will shortly end in victory for the embattled Department of Agriculture experts and farmers.

With the exception of areas in four counties, Custer, Roosevelt, Prairie and Garfield, rains in Montana have held 'hoppers to the ground as well as promised crops good enough to revive the farmers' interest in doing everything possible to save their plantings. Crops in the infested areas of the four counties have been almost completely destroyed, however.

The Federal government is also active in Nebraska and South Dakota in control operations, Mr. Strong's report showed.

Science News Letter, July 8, 1939

ENGINEERING

New Patent Shows Navy's Method of Detecting Flaws

THE U. S. Navy's way of detecting hidden flaws in airplane propellers and other metal castings was disclosed by the issuing of patent No. 2,162,710 to Dr. Ross Gunn, scientist of the Naval Research Laboratory.

Induced electric currents, known as eddy currents, are set up in the metal castings. The pattern of their magnetic fields changes characteristically when an unseeable flaw occurs in the metal.

Science News Letter, July 8, 1939

After inhaling hydrogen gas, an individual's voice is temporarily so high pitched that it sounds almost falsetto.

E FIELDS

PHYSICS

Make Radioactive Iron With Half Life of 10 Years

ONE of the longest lived of all artificially radioactive elements was discovered at the radiation laboratory of the University of California by Drs. J. J. Livingood, now at Harvard, and G. T. Seaborg of the chemistry department.

The new element, made radioactive by bombardment with the charged ions of deuterium atoms, is an isotope of iron having a half life of more than 10 years.

As described by the scientists in the Physical Review, its radioactivity declines by half its original intensity in a ten-year period. After another ten years it will be reduced again by half and so on.

Also reported to the physicists' journal by Dr. W. F. Libby, also at the University of California, is the discovery that the natural splitting of uranium and thorium, if it occurs at all, is a very long-lived process with a half life of more than 1×10^{14} years or one followed by 14 ciphers, (100,000,000,000,000).

This result will relieve the minds of geologists who have been determining the age of the earth by noting the natural radioactivity of uranium and its disintegration into its other elements that eventually end up by being lead.

With the recent discovery that uranium and thorium could be split into two medium weight elements in the laboratory by bombardment with neutrons, immediately the accuracy of the previous work on the age of the earth was thrown into doubt. Dr. Libby's finding will do much to nullify these fears.

Science News Letter, July 8, 1939

ARCHAEOLOGY

Ancient Egyptian Scripts Found on Crocodile Mummies

QUANTITIES of Egyptian writings, salvaged from their second-hand role as wrapping paper around crocodile mummies, have safely reached the University of California.

For 38 years, these mummy wrappings and other papyri forming a collection of more than 1,000 Egyptian writings have been en route to the University. At Oxford University and the British Museum, where the collection stopped-over, British scientists have been studying the documents. They are pronounced extremely valuable, shedding light on the transition period of Egyptian history, reigns of the later Ptolemaic Pharaohs, and early centuries of Roman rule. They are mainly written in Greek, the business and social language of Egypt in centuries shortly before and after the time of Christ.

The "crocodile" papyri in the collection were found in an amusing accident, when an expedition headed by Dr. George A. Reisner, then of the University of California, was excavating at Tebtunis, in 1899-1900. A workman became exasperated at finding more and more mummified crocodiles, when the archaeologists hoped for better things. Angrily, he threw down one crocodile and to his amazement it broke revealing a stuffing of the much-sought papyrus manuscripts of old Egypt.

Unwrapping crocodiles became the expedition's most engrossing business for the next few days, and out of several thousand animals about two per cent. were wrapped or stuffed with writings. Poor condition of many of the papyrus sheets has been one cause of delay in the British research on them.

Science News Letter, July 8, 1939

ENGINEERING

5,000-Horsepower Engines Predicted By Engineer

HUGE engines, with 24 cylinders and more, developing up to 5,000 horsepower as compared with the 2400 horsepower of which the largest American engine and currently the world's largest is capable, were predicted as a development of aviation during the next five or ten years in response to military needs, by F. R. Banks, technical manager of the Associated Ethyl Company, Limited, of London, before the World Automotive Engineering Congress.

They will employ banks of cylinders arranged in X- or H-formation, or radially mounted banks, all liquid-cooled in place of the air-cooling which is still widely used, Mr. Banks asserted.

Improved fuels, larger cylinders, higher engine speeds than are now common and other changes in present practice will make such aerial monsters possible, he said.

Science News Letter, July 8, 1939

About 70 of the national forests in 20 states have winter sports facilities.

POPULATION

Cities Dwindling Because Parenthood Lacks Prestige

AMERICAN cities, long accustomed to a "Watch Takoma Grow" outlook of boom expansion are now faced with a decline in growth amounting to a fourth of their population in a single generation.

If the cities in the world of tomorrow are not to be marked with empty echoing streets and vacated skyscrapers where now millions throng, it will only be because of migrations from other regions or nations where children still flourish.

The present decline in population growth in the United States is due, not to any biological decline in fertility among moderns, nor to economic factors, as such, but to the powerful influence of our social atmosphere, declares Dr. Warren S. Thompson, population expert of the Scripps Foundation for Research in Population Problems.

You hear people say "we cannot afford more children." But it is not the very poor who feel that way. It is the relatively well-to-do.

"What it really means," says Dr. Thompson, "is that if we have more children we cannot travel as we would like to, we cannot live in as good a house as we want to, we cannot drive as good a car as our neighbors, we cannot go out (theater, bridge, etc.) as much as our friends, I shall not be able to go with my husband as frequently as otherwise, etc.

"In other words the whole scheme of life and scale of values we have come to regard as valid has no place in it for the three or four children needed to maintain numbers."

Most of the women of America fall far short of those three or four children in their families. Almost 30 per cent., estimates Dr. Thompson, have no children, 18 per cent. have only one child and another 18 per cent. have only two children.

Before men and women will want large families, it will be necessary for the social environment to change so that "there is no handicapping economic or social discrimination between those who want to contribute to community life by raising families of the proper size as well as through their own work and those who are interested in making their contribution only through their own work."

Science News Letter, July 8, 1939

AERONAUTICS

U. S. Air Center Speeds Research

Nation's Biggest Aeronautical Laboratory Must Usher 4,000 Planes into Air Corps

By LEONARD H. ENGEL

THE BIGGEST aeronautical laboratory in the United States is getting set today for the greatest test job in the history of American aviation—ushering 4,000 warbirds into the Air Corps as Uncle Sam prepares the mightiest Army air fleet he has ever had.

Even as War Department officials work without furlough, and Sundays and evenings too, to speed orders to factories all over the country, there's an atmosphere of bustle and hurry-up at Wright Field, the Army's $10,000,000 experimental plant on the outskirts of Dayton, O.

There it is that the new winged guardians of the nation must meet the acid test: will they work? From mightiest four-motored flying fortress down to tiniest fighter, they have all gone through the mill at the mile-square flying field near the birthplace of the brothers after whom the field is named. And every one of the newest will "get the works" there, too—450-mile-an-hour pursuit, 400-mile-an-hour attack bomber, and rocket-like interceptor.

Work Speeded

Contracts and specifications for the new planes are being drawn up there and in Washington before money for their purchase is actually available, so that not a moment will be lost. Engineers at Wright Field are figuring their routines closely to get more results in less time. Engine test stands are being enlarged to try out more and bigger motors for the 450-mile-an-hour pursuit plane now here and the 500-mile-an-hour fighter which will be going into service toward the end of the air armament program. Wright Field is beginning to beat with the quickest pulse in the 12 years it has served as headquarters for the Materiel Division, that section of the Air Corps charged with securing, testing and maintaining everything an air force needs from airplanes and airports down to the pilot's goggles.

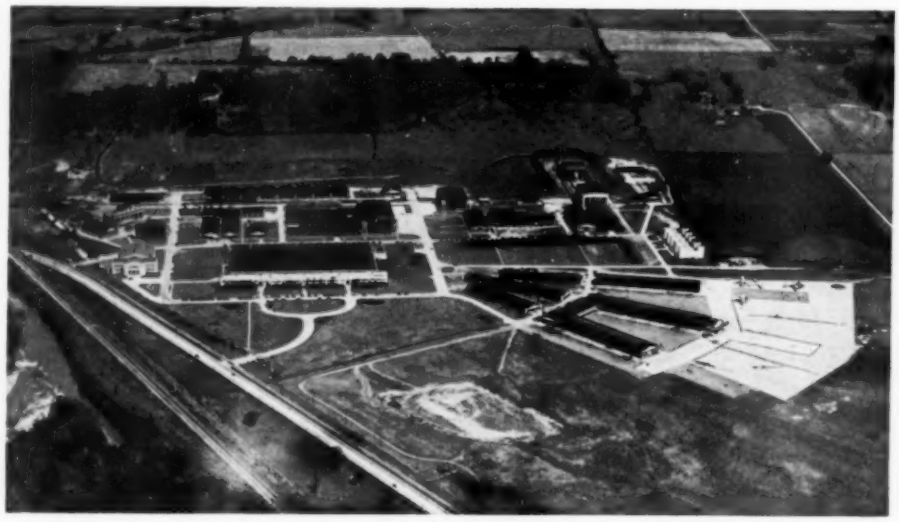
An Army plane has a long history behind it by the time it reaches the hands of the combat flyer, and much of that history has happened in and around the Dayton test plant. Like as not, it is a Wright Field engineer who draws up the specifications the manufacturer competing for a contract must fulfill. It is certainly in one of the rooms off the long corridor in the administration building that a crisp officer opens and reads aloud sealed bids citing how much the new craft, perhaps at that moment resting outside on the flying line, will cost the government. And during the months following the opening of the bids, an Army board of merit pries into its most intimate secrets: taking it apart, peering at the metals of which it is made; putting it together again, flying it to see whether it really does that 400 miles an hour the manufacturer claimed.

Guard Buildings

Fifty buildings, whose interiors are closely guarded from spying eyes, house the 1650 officers and civilian employees who make up the Wright Field staff of the Materiel Division, whose activities are in the national spotlight as a result of the expansion program. At any time, there are likely to be as many as 100 planes of nearly as many types, in various stages of disassembly, in the three long hangars converging on the roomy concrete apron. Half a dozen crack flyers, Army test pilots, are on hand to carry out hours of patient flying, under the command of veteran Maj. Stanley Umstead, an artist at the scientifically precise flight required of an aviator who must prove or disprove planes. Over all is a quietly forceful 53-year-old brigadier general, George C. Brett, who has just been assigned the command and moves in at a time when the heat is on as it has never been before.

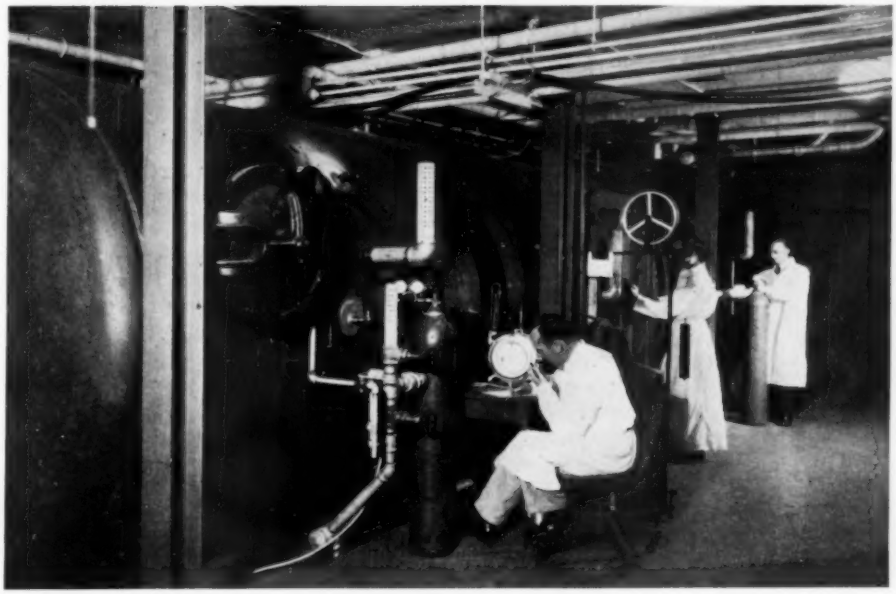
The story of the birth and infancy of an Army plane is perhaps best summarized in the organization of the technicians and equipment under Gen. Brett. Most important of the Wright Field sections is the engineering section, made up of five branches: aircraft, power plant, equipment, materials and armament. Besides the extensive research programs each section has under way so that future planes may be better than present ones, each section checks on its particular phase of a new plane submitted to the Army.

It is not until each has certified that the features of particular concern to itself are satisfactory, that the plane can be considered for equipping the Air Corps. Even after that, as a matter of fact, an experimental ship's days of trial are not over. If it is of a radically new type, the Army may order only a dozen more so that it can be more thoroughly



AIR VIEW

Wright Field from the air showing the research laboratories in the left foreground, testing laboratories at the right, and hangars, fan-shaped, in the right foreground.



ALTITUDE TESTING

Captain Armstrong seated in foreground is communicating by telephone with officers undergoing special altitude tests inside the pressure chamber.

proved by test service and so that tactics for its use may be worked out by combat officers.

Over and above these intensive activities is one of the greatest aeronautical research programs in the world, most of it now wrapped in deepest secrecy. It will not be neglected, despite the rush of test work now on the horizon. The charge of providing the Air Corps with the best equipment obtainable includes also developing what cannot yet be bought, the Materiel Division and Army chiefs hold. Civil aviation has benefited in dozens of ways directly from this research program. Some developments, for example, have even been useful in fields outside both national defense and aviation. The world's first single-cylinder engine for testing the knocking of gasoline is a Wright Field product. Its use by civilian engineers has brought better automobile engines and better fuels, both resulting in improved performance and efficiency of your automobile.

45-Foot Propellers Tested

The Materiel Division has a wealth of equipment for carrying out its manifold duties. The largest propeller test rig in the world, capable of whirling a 45-foot propeller—three times as large as any actually in service—at speeds up to 4300 revolutions a minute is at Wright Field. It takes a 6,000 horsepower motor, more powerful than any railroad locomotive in existence, to turn such a huge blade at that speed.

You can hear the roar of engines in the test stands in the dynamometer laboratory—where an engine's power is rated—as you drive into the guarded entrance. Even though fundamental research in aerodynamics is left to the National Advisory Committee's elaborate laboratory at Langley Field, Va., there's a wind tunnel at Wright Field, and a new one is to be built as part of a $1,300,000 expansion program financed by the Works Progress Administration. The Army must know the effect of adding a gadget to one of its planes and the wind tunnel furnishes the most satisfactory means of finding out.

Another building has one of the best collections of sandbags and lead bars extant—but their purpose isn't deadly. They are there to crack airplane wings and other structures—or at least make sure that they can stand up and take the loads to which they are subjected in flight. This is particularly important because military pilots and planes are called upon to perform strenuous maneuvers no private or commercial pilot in his right mind would think of doing. Many a wing that might have come off at the end of a 300-mile-an-hour power dive came off in the static load laboratory instead and was rejected.

You can go up to altitudes of 40,000 feet without ever taking your feet off mother earth in another laboratory—in an altitude pressure tank which copies the low air pressures of the upper altitudes so that Capt. Harry G. Armstrong and his Medical Corps associates in the Physiological Laboratory can find out what happens to human beings under these conditions. The Signal Corps of the Army also maintains a radio laboratory at the field; it is responsible for all Army radio, aloft and on the ground.

In five years airline passengers will be making transcontinental trips at flight levels as high as 30,000 feet. They will be able to thank the Army in large part for that. The world's first pressure cabin airplane actually to fly in the substratosphere is an Army baby: the Lockheed XC-35, which won its pioneers the Collier Trophy for 1937, an outstanding aviation award made annually in recognition of important trail-blazing aloft.

The first blind landing in history was executed by Capt. A. F. Hegenberger at Wright Field in 1932. In two or three years, blind landings will be commonplace on the airlines. The system eventually adopted will feature standards the Army has found are necessary to safety and has wisely insisted on. The Army will have its way because the same system must be used all over the nation.

Three Army pilots even carried that one step further in 1937 by making a completely automatic landing, and now they are working on automatic take-off. If we ever have robot airplanes, Uncle Sam's engineers and aviators will have owing to them a major portion of the credit.

Wright Brothers Honored

Perhaps in recognition of Dayton's contribution to aviation as the home city of the Wright brothers, the busy Ohio city has always been the locale of Army air experimenting and testing. During the World War the Army established McCook Field. When McCook became inadequate, the citizens of Dayton presented the government with a tract of land they had bought just outside their city. That is where Wright Field is now.

Running such a vast organization as this has its heartaches and headaches, too, as well as its accomplishments. Twenty-two names are inscribed on the field's roll of honor—those whose lives, in the disasters attendant upon trying the unproved, have paid for progress. And Wright Field's headaches include the loss of key civilian engineers who too often leave government employ because of the greater return to be gained by working for one of the rapidly-growing private aircraft plants. That problem has become particularly acute during the

FOR TESTING

Propeller test rig with propeller mounted and ready for testing.

last year, with the tremendous expansion of aircraft production.

Guarding Wright Field's secrets is another worry. The visitor is welcome, but he had better not go where he isn't entitled to—for the Army has a unique system for seeing to it that even the curious stay within bounds. Visitors, upon registering, are given lapel badges, differently colored according to where they are to be permitted. The Army had to resort to its many-hued identifying badges because of the large number of visiting aircraft manufacturers and others who have legitimate and pressing business with the Air Corps' engineers and airplane purchasers.

Aviation has come far during the last decade and the U. S. Army Air Corps can claim many of the mileposts along the way as its contributions. You can still see these contributions and the story of progress they contain in the hangars. Aviation's and Wright Field's story is told in the varying types of planes present—from slow bi-plane fighters and bombers of years ago, all clumsy with struts and "barn doors" into the wind, to the sleek knife-like creatures the mechanics are bending over today.

Perhaps some of these old "crates" will have to be moved out of the hangar and across the nest of buildings to the Army's new Aero Museum in one corner of the field. If so, it will be to make room for the new flock, born of a determination to arm in the air, and be quick about it, as a result of the urgency of the new program. Wright Field has never been a lazy place. But you ought to see it now.

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ARCHAEOLOGY

Find Ancient "Pittsburgh" Built By King Solomon

THE "PITTSBURGH" of ancient Palestine, and the prototype of the modern factory town is being uncovered in Palestine where it is believed to have been laid out and constructed by King Solomon.

A new campaign of excavation has just been completed by Nelson Glueck, director of the American School of Oriental Research, Jerusalem, whose report was made public by Prof. Millar Burrows of Yale University, president of the American Schools of Oriental Research.

The city, Ezion-Geber in the Bible, which was also Palestine's most important seaport, was built in the tenth century before Christ, Dr. Glueck says. Until last year the exact location of Solomon's seaport had long been unknown, but explorations near Akabah had laid bare the site, now known to the Arabs as Tell el-Kheleifeh. Akabah is located on the northern end of the Gulf of Akabah, which is the eastern arm of the Red Sea, the Gulf of Suez being the western arm.

"King Solomon alone in his day had the ability, the vision and the power to build a great factory town and seaport a comparatively long distance from the capital city of Jerusalem," the report says. In Solomon's time, Ezion-Geber was a strongly fortified factory site and many of its buildings were heated.

"The city had an extensive system of smelting and refining plants, whose walls were likewise pierced with a more intricate arrangement of flues and air channels, than had been previously suspected. The excavations are by no means concluded as yet, but it seems safe to assume that much of the town was occupied by an elaborate complex of smelters and refineries with the necessary air blasts for the furnaces furnished by the strong winds blowing almost continuously from the north. The entire town was, considering the country and the period, a great factory site of a nature unparalleled in the history of the ancient Orient."

Science News Letter, July 8, 1939

ZOOLOGY

Monkey Birth On Island Assures Success of Colony

BIRTH of a very important baby was recently flashed by radio from tiny Santiago island, half a mile off the coast of Puerto Rico.

The infant is not of royal birth, or the child of a high official—nothing but a tiny, inquisitive monkey baby. Its birth is important because it indicates that the colony of 400 monkeys from southeastern Asia, planted on this 36-acre island a few months ago, is going to increase and multiply, and possess that corner of the earth.

The radio announcing the arrival of the Number One monkey baby adds, "From all appearances numerous others expected in very near future."

The colony of Asiatic monkeys was established on Santiago island as a joint enterprise of Columbia University and the Puerto Rico School of Tropical Medicine, in the hope of ending American scientists' expensive dependence on monkeys shipped halfway around the world for experimental purposes. For tests of causative agents and possible cures of certain diseases, such as infantile paralysis, ordinary laboratory animals like guinea pigs will not serve. Aside from human beings, some diseases will attack only our closer kindred among the animals, so for such purposes monkeys have to be used.

The monkeys on Santiago island have full freedom of the place. The only human beings who live there are Mr. and Mrs. Michael Tomilin, who set out food, keep an eye on the health of the colony, and act as the "government" of the simian paradise.

Science News Letter, July 8, 1939

The 17-year cicadas are out in Illinois and neighboring states this year.

MEDICINE

Serum Plus Sulfapyridine Advised for Pneumonia

THE COMBINATION of both anti-pneumonia serum and the new chemical remedy, sulfapyridine, is more successful in treating pneumonia than either serum or chemical remedy alone, Dr. Maxwell Finland, of Thorndyke Memorial Laboratory, Boston, told members of the Conference of Health Officers and Public Health Nurses meeting at Sarasota Springs, N. Y.

Serum can be used and will be successful in about two-thirds of the cases of pneumonia due to the pneumococcus, Dr. Finland said. Sulfapyridine is probably useful in all types of pneumococcus pneumonia and is probably as successful as the older remedy, sulfanilamide, in treating infections with the hemolytic streptococcus. Sulfapyridine may also be useful in some cases of infection with another very common germ, the staphylococcus aureus.

Typing and other tests to determine the kind of germ causing the pneumonia should be done, Dr. Finland believes, even if the doctor expects to treat the patient with a chemical remedy instead of serum. Then if it turns out that the patient cannot stand the drug, serum can be given without further delay.

Fathers Get Best Food

FATHERS may feel they do not always get their due but when it comes to food, fathers in poor families get the best of it, a survey of 100 Toronto families shows. Results of the survey, made on families not on relief with an average weekly income per person of $3.48, were reported by Dr. E. W. McHenry, of the Toronto University School of Hygiene.

On the average, Dr. McHenry said, the families secured about three-fourths of the total amount of food they needed. Only three of the 100 families received an adequate total amount of food.

The men got nearly nine-tenths of the amount of protein they needed, but the women received less than three-fourths of the needed amount. The children received only half the calcium (lime) they needed but half the men actually got more calcium than they needed. This was believed due to the fact that cheese was used generously in the men's diet but was not given to the children, and the children failed to get enough milk.

Almost all the men received more iron than they needed but the mothers and children received only one-half of a suitable supply.

The inadequate food supply of the mother, Dr. McHenry pointed out, not only prejudices her health but has a harmful effect on her child if she is carrying or nursing one.

Science News Letter, July 8, 1939

PHYSICS

High Altitude Neutrons Are Clue to New Atom-Smashing

NEUTRAL atomic fragments by the billions, 1,000 times more plentiful at 13 miles overhead than at sea level, give the first clue to a new kind of atom smashing, Dr. S. A. Korff of the Franklin Institute's Bartol Research Foundation suggested to the American Physical Society meeting at Princeton.

The fragments are neutrons, atomic particles without electrical charge that have amazing ability to pierce all atoms.

Sending a new type of neutron detector 70,000 feet up in unmanned balloons, Dr. Korff found that while cosmic ray intensity was increasing 100 times over sea level intensities the neutron intensity was increasing by 1,000 times.

Explaining the origin of the stratosphere neutrons, Dr. Korff said:

"If a cosmic ray collides with a nitrogen nucleus and completely disrupts it, seven neutrons will be liberated. The presence of neutrons may be an indication of some such explosion induced by cosmic rays in our atmosphere. Cosmic rays are the only agency with sufficient energy to produce such a disruption. Possibly these neutrons are the clue to an important new atom-smashing process."

Science News Letter, July 8, 1939

Egg-Shaped Charge

SCIENTISTS have a new electrical picture of the unseeable atom—an egg-shaped glob of electrical charge.

The new atom portrait was painted verbally by a three-man research team from Columbia University, Prof. I. I. Rabi, Drs. L. M. B. Kellogg and N. F. Ramsay, and Prof. J. R. Zacharias of the College of the City of New York.

Telling their scientific colleagues that they had "confirmed the existence of the deuteron quadrupole moment" the Columbia investigators described how they made the discovery of egg-shaped electrical pattern for deuterium atoms. Deuterons are the electrically charged nuclei of this rare kind of heavyweight hydrogen.

The new results of egg-shaped electrical distribution are helping the mathematical physicists in their important calculations of the inter-nuclear forces; forces which determine how all material matter is put together.

What the experiment really detects is the resonance vibrations of the nuclei in terms of exactly known radio frequencies. Plotting out the measurements the scientists obtain curves on which resonance points resemble spectral lines on a photographic plate.

In fact, the operations of the molecular beam apparatus are in many ways comparable to those of a spectrograph except it works with radio waves instead of rays of light.

Where a spectrograph picks up light rays and forms characteristically-placed spectral lines, the Rabi equipment detects characteristic resonance points formed by the magnetic properties of the atoms and molecules. The placement of these points is likewise unique for each element.

Science News Letter, July 8, 1939

Regimentation in Extreme

SOME of the dictator nations which like to order and regiment the lives of all their inhabitants could get some ideas on super-regimentation from an experiment described to the meeting.

Dr. Sidney Siegel, Westinghouse research fellow, described his ability to produce single crystals of gold-copper alloys which, in some cases, contain one septillion atoms (1,000,000,000,000,000,-

000,000,000) all arranged in perfect alignment and set into a single regular pattern. Here is regimentation to end all regimentation.

Object of the large single crystals, which are sometimes four inches long and three-sixteenths of an inch in diameter, is to study the forces which bind metals of alloys together.

Science News Letter, July 8, 1939

PSYCHOLOGY

First Steps to Language Discovered in Chimpanzees

BEGINNINGS of the ability that enables man to talk have been discovered in man's close relatives, the chimpanzees, by Drs. Robert M. Yerkes and Henry W. Nissen, of Yale University's Laboratories of Primate Biology, they revealed (*Science*, June 23).

All apes do not have the symbolic ability necessary for speech, the scientists indicate. And use of symbols as simple to man as "blackness" or "whiteness" is very difficult for any chimpanzee. This makes them think they may have stumbled on the very start of pre-linguistic ability in the evolutionary ladder.

A fundamental difference between man and the very man-like chimpanzee is revealed by one test of this ability to use symbols. Food is placed in one of two boxes and then the relative positions of the boxes are changed.

A man is able to find the food again with no difficulty. He may have said to himself as he watched it placed there, "It is in the black box" or "It is in the white box."

The ape, apparently lacking an understanding of "whiteness" or "blackness," finds the same problem extremely difficult if not entirely impossible. If, however, the ape has a cue to tell him on which side the box with the food has been placed, the problem becomes simple.

"It appears," the scientists conclude, "that whereas the 'thereness' of the correct box may readily be responded to by the chimpanzee, the 'thatness'—as exemplified by a symbolic process equivalent to rectangular whiteness—is used with difficulty and uncertainty."

Symbolic thinking may occasionally occur in the chimpanzee, these scientists conclude, but it is relatively rudimentary and ineffective. Older, more experienced chimpanzees are no better at it than are the young.

Science News Letter, July 8, 1939

PHYSICS

Best Ways to Make Raindrops Studied to Aid Ray Research

A WELL known weather phenomenon which may make rain threaten but never come is helping scientists trap cosmic rays in better fashion, it was reported to the American Physical Society meeting at Stanford University by Dr. Robert M. Langer of California Institute of Technology.

"There may be excess moisture in the atmosphere and rain may threaten for a long time before the droplets grow big enough to fall," explains Dr. Langer. "The condensation of water vapor from the air on to the drop happens rapidly enough at first but so much heat is given out in the process that the droplet warms up until the evaporation from it just about equals the condensation upon it.

"Unless this heat of condensation is dissipated the droplet will stop growing before it can be seen. The best way to dispose of the heat is to pass it into the surrounding air if this air remains cool enough."

This matter of "why it doesn't rain" is important not only to the weatherman but also to cosmic ray scientists who make the rays become visible by having them create paths of artificial raindrops in special instruments known as Wilson cloud chambers.

The idea, Dr. Langer adds, is to produce a fog along the track of the cosmic ray. If the fog particles form slowly the track is distorted meanwhile by air currents. A false impression of the track is obtained.

Working with Dr. Carl Anderson, Nobel Prize winner of California Institute of Technology, and with Dr. Seth Neddermeyer and Dr. J. K. Boggild, exchange fellow from Denmark, Dr. Langer has found that it takes a full second for fog drops in a cloud chamber to attain full growth. Nothing, apparently, can decrease this time without spoiling some other feature of the experimental arrangement.

As a result, he reports, extreme precautions must be taken to prevent air currents before good cosmic ray tracks are to be expected.

Science News Letter, July 8, 1939

METALLURGY

Metallurgical "Surgeons" Operate on Steel Mill

See Front Cover

NOT a group of witches stirring their mysterious cauldron, but a group of arc welders doing a major operation are shown on the front cover of this week's SCIENCE NEWS LETTER. Such operations are now as common in the industrial world as appendectomies are to the average person. This particular operation was to quickly restore a steel mill to service by repairing the pusher head of a scale breaker which is used to remove slag from slabs coming from the reheating furnace.

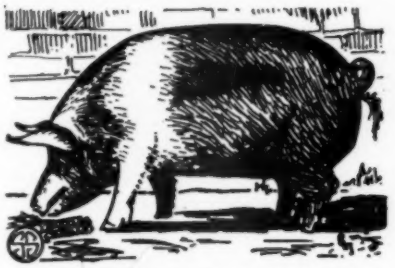
To repair the break which stopped an entire mill, 400 pounds of steel, in the form of arc welding electrodes supplied by The Lincoln Electric Company, Cleveland, Ohio, were melted into the casting. Without electric arc welding, the mill would have been shut down for several weeks awaiting a new casting. Six arc welders had the mill back in operation in eight hours.

Science News Letter, July 8, 1939

The papyrus plant, once so useful to Egypt, no longer grows there.

VETERINARY MEDICINE

NATURE RAMBLINGS *by Frank Thone*



Enemies of Swine

EARTHWORMS have been found to play a villain's role in the transmission of swine influenza, a troublesome and money-losing disease of pigs. Their conviction as disease carriers is based on experiments conducted at the Rockefeller Institute for Medical Research, by Dr. Richard E. Shope. (*Science,* May 12)

The cycle of swine influenza is a more complicated affair than the mosquito-man combination in such diseases as malaria and yellow fever. It involves the pig, the earthworm, a parasitic lungworm that lives part of the time in the pig and the rest of its life in the earthworm, a filterable virus (the ultimate cause of the disease) that the lungworm always carries, and a bacterium known as *Hemophylus influenzae suis* that provokes the virus to produce the disease symptoms.

It goes something like this: the earthworm unconsciously eats the bloodworm eggs after they are discharged from the pig's body. The virus, associated with the eggs, lives on in the young bloodworms that emerge from them. Then a pig eats the earthworm.

The larval lungworms burrow through the digestive organ walls, enter the blood stream, and finally arrive in the lungs, where they stay. There they encounter the bacteria which cause the influenza virus to become active, producing typical symptoms of swine influenza.

The bacteria are not necessarily the only possible stimulus to the virus, Dr. Shope states. Under experimental conditions he was able to activate the virus with an injection of calcium chloride solution into the cavity around the lungs.

Once started in a herd of swine, the highly contagious disease is able to pass directly from pig to pig without the assistance of the earthworms.

Science News Letter, July 8, 1939

PUBLIC HEALTH

New Health Menace Seen in Cadmium Coatings on Utensils

A NEW health menace, chronic cadmium poisoning from foods contaminated with this metal which is being used in coating metal utensils, was revealed in a report to the American Association for the Advancement of Science's Pacific Division by Drs. R. H. Wilson and Floyd DeEds, of the U. S. Bureau of Chemistry and Soils stationed at Stanford University School of Medicine.

Cadmium is being used to coat articles which may come in contact with foods, such as buckets and milk cans, meat hooks, meat grinders and the like.

An outbreak of acute cadmium poisoning, due to cadmium contamination of cottage cheese from milk cans, was reported some years ago.

Without wishing to alarm the public, the government scientists have been investigating the possibility of a chronic form of the poisoning arising from eating small amounts of cadmium contaminated foods over a long period.

Anemia and markedly enlarged hearts were found in rats that had been fed a minute amount of cadmium chloride (0.0125 per cent) in the diet. The heart enlargement, it is believed, is due to increased heart work in the effort to keep the body supplied with sufficient red blood cells, which are too low in anemic blood.

Science News Letter, July 8, 1939

Dye For Trichinosis

NOW IT IS trichinosis which medical scientists are trying to conquer with their new chemical weapon, sulfanilamide. Trichinosis is the disease that comes from eating undercooked "measly" pork. There is no specific remedy for it.

Sulfanilamide, famous for its curative effect in streptococcus and other germ ailments, was less effective as a trichinosis remedy in rats than phenothiazine, Drs. James B. McNaught, Rodney R. Beard and Floyd DeEds, of the U. S. Department of Agriculture and Stanford University School of Medicine, reported.

The infected rats that got phenothiazine in their diet had 74 per cent less trichinella larvae at the end of six weeks than did those on a diet containing no drug.

Science News Letter, July 8, 1939

Living Fossils in Protein

THE MYSTERY of life is locked in the structure of the proteins, the characteristic chemical compounds which always accompany life and without which life is impossible, Prof. J. D. Bernal, of the University of London, suggested.

There is much evidence that protein, familiar to us in food, clothing and other material from living things, is the product of a long evolution of chemical forms, Prof. Bernal explained. Another theory, for which there is less evidence, is that protein is simply an arrangement of atoms or of amino-acids of such low energy that it will tend to be formed whenever suitable materials are found together.

The protein molecule may be considered a living fossil, Prof. Bernal said. This is because all protein molecules that we know now have been made by other protein molecules, and these in turn by others. Thus the evolution of the protein molecule has run parallel with the evolution of the organisms which are constructed from them. The structure of proteins is viewed as a key to the solution of many of the problems of the development and origin of life.

Science News Letter, July 8, 1939

•First Glances at New Books

Photography

THE PHOTOGRAPHIC BUYERS' HANDBOOK—A. R. Lambert, ed.—*Simon and Schuster,* 343 p., $2.75. Here are comparative data and ratings for miniature and other cameras and also various accessories and equipment. The book was prepared with the cooperation of Consumers Union, and contains helpful information for anyone contemplating a large purchase or numerous purchases in this field.

Science News Letter, July 8, 1939

Natural History

1938 YEARBOOK PARK AND RECREATION PROGRESS—U. S. National Park Service—*Govt. Print. Off.,* 92 p., illus., 35c. A symposium of reports of progress in national, state and municipal parks, parkways and recreation areas. An especially valuable feature is the tabulated summary of state park laws.

Science News Letter, July 8, 1939

Medicine—Economics

ECONOMIC ASPECTS OF MEDICAL SERVICES—Paul A. Dodd and E. F. Penrose—*Graphic Arts,* 497 p., $3.75. A vast array of facts and figures on economic aspects of medical and public health services, especially as they relate to conditions in California, with recommendations on health insurance, are presented in this book by economists of the University of California.

Science News Letter, July 8, 1939

Anthropology

THE RACES OF EUROPE—Carleton Stevens Coon—*Macmillan,* 739 p., $7. Starting with the Old Stone Age, this text for college use presents a moving panorama of the development and present state of races inhabiting the earth. Needless to say, it is comprehensive, outfitted with numerous photographs of racial types and data tables describing them. Yet, Prof. Coon laments "weak spots" in anthropological knowledge, and hopes no less than five will be strengthened before his book is revised or displaced.

Science News Letter, July 8, 1939

Engineering—History

A SHORT HISTORY OF THE STEAM ENGINE—H. W. Dickinson—*Cambridge (Macmillan),* 255 p., $3.50. Here is authentic history of a major development of human genius by the man who is the accepted biographer of Watt, Boulton and other notables who made the steam engine possible.

Science News Letter, July 8, 1939

Medicine

MEDICINE AT THE CROSSROADS—Bertram M. Bernheim—*Morrow,* 256 p., $2.50. A doctor takes doctors to task for not having been more alert to see and to face their own and the public's problems relating to the social and economic sides of medical care. The book is forcefully written but it is distinguished by a lack of malice and of that acrimony which characterizes so much lay and professional discussion of the problem.

Science News Letter, July 8, 1939

Forestry

AN OUTLINE OF FORESTRY—Thomas Thomson and M. R. K. Jerram—*Nordemann,* 208 p., $2.25. Although written with first reference to British conditions, this book presents the basic principles of forestry so clearly and in such good arrangement that it will be useful anywhere.

Science News Letter, July 8, 1939

Geology

A TEXTBOOK OF GEOMORPHOLOGY—Philip G. Worcester—*Van Nostrand,* 565 p., $4. A well-conceived, well-illustrated textbook for use in beginning college classes in geology.

Science News Letter, July 8, 1939

Meteorology

THE DRAMA OF WEATHER—Sir Napier Shaw—*Cambridge (Macmillan),* 307 p., $3.50. Anyone who wishes to learn about the weather must needs have Shaw for one of his teachers. His book, which in half-a-dozen years has become a classic in its field, now goes into its second edition, enlarged and considerably revised.

Science News Letter, July 8, 1939

Chemistry

AN INTRODUCTION TO THE CHEMISTRY OF CELLULOSE—J. T. Marsh and F. C. Wood—*Van Nostrand,* 431 p., $7.50. A text of British origin giving in profuse detail the known matters about its field. A book of reference for the expert and the starting point for new workers in the subject.

Science News Letter, July 8, 1939

Forestry

FORESTRY AND STATE CONTROL—R. S. Troup—*Oxford,* 83 p., $1.35. Problems of state control of privately owned forest lands as they are now being faced in Britain, with brief reviews of practices in other European countries for comparison.

Science News Letter, July 8, 1939

Chemistry

ESSENTIALS OF GENERAL CHEMISTRY—George W. Sears—*International Textbook Co.,* 413 p., $3.50. An introductory college textbook, by the head of the department at the University of Nevada, which revolves around the periodic table of the chemical elements as its central theme.

Science News Letter, July 8, 1939

Geography

PENTHOUSE OF THE GODS—Theos Bernard—*Scribner,* 344 p., $3.50. The American-born author is made a Buddhist lama and is permitted special religious experiences in Lhasa and other Tibetan cities. He deals less with the mysticism of Tibet, however, than with the remarkable land itself, which he describes in sprightly manner from his advantageous viewpoint. Many of his fine photographs illustrate the book.

Science News Letter, July 8, 1939

Mathematics

PLANE TRIGONOMETRY—W. T. Stratton and R. D. Dougherty—*Prentice-Hall,* 118 p., $2.25. From Kansas State College comes this text intended for either high school or college use.

Science News Letter, July 8, 1939

Chemistry

THE NATURE OF THE CHEMICAL BOND AND THE STRUCTURE OF MOLECULES AND CRYSTALS—Linus Pauling—*Cornell Univ. Press,* 429 p., $4.50. Molecular structure from the quantum mechanical point of view with especial emphasis on the new concept of molecular resonance. No knowledge of quantum mechanics or higher mathematics on the part of the reader is assumed for the book is the outgrowth of Prof. Pauling's Baker Lectures at Cornell University and his courses at California Institute of Technology.

Science News Letter, July 8, 1939

Education

HOME IS FUN—Miriam E. Mason—*Beckley-Cardy,* 157 p., 80c. A school book with many brightly colored pictures for the very youngest readers.

Science News Letter, July 8, 1939

Entomology

A BUTTERFLY BOOK FOR THE POCKET—Edmund Sandars—*Oxford Univ. Press,* 332 p., $3. A book of British butterflies, many of them of course represented on this continent also. The color-printing of the illustrations is exceptionally good for a popular-priced book.

Science News Letter, July 8, 1939